THE EFFECT OF THE FLASH OF A FLASH BULB ON THE ACCURACY OF FREE THROW SHOOTING IN BASKETBALL

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by

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INTRODUCTION

Basketball is a sport that is participated in by many players, viewed by large numbers of spectators, and taught by a great number of athletic coaches. This exciting sport is so complex that many different problems arise. "Regardless of what else takes place on the court, accurate shooting is a must if a team is to become and remain a strong contender," declares Sharman.[1] The art of scoring consistently in free throw shooting is one phase of the game that is experienced only by a small number of basketball players, considering the large number of players participating at the junior high school, high school, college, university, and professional levels. Bobby Wanzer and Dolph Schayes "are the only two players, besides myself, who have ever shot more than 90 per cent from the free-throw line in the history of the N.B.A. (National Basketball Association)," states Sharman.[2] These many problems such as shooting poise, fatigue, pressure, tension, and distractions that arise with free

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[1] Bill Sharman, Sharman on Basketball Shooting (Englewood Cliffs: Prentice-Hall, Inc., 1965), p. 21.

[2] Ibid., p. 94.

throw shooting are the concern of every basketball coach, no matter what level of the game he is coaching. Each basketball instructor realizes that a basketball game can be won or lost depending on his team's accuracy at the free throw line. Because the players, the spectators, and the coaches all wish to have the accuracy of free throw shooting improved, these many problems must be solved.

I. THE PROBLEM

Statement of the problem. It was the purpose of this study to investigate the effect of the flash of a cameraman's photographic flash bulb on free throw accuracy, and to present information which will aid basketball authorities in determining if there is a need to control the placement or the position of flash cameras during basketball games.

Importance of the study. The importance of this experimental study was twofold. First, the author wished to discover if the flash from a flash bulb could cause a measured effect that might be a factor for teams scoring a low percentage of free throws. "How often have coaches rationalized---if the boys had hit a better percentage

of their free throws, we would have won," said Basile.[1] A second importance of the study was a lack of information concerning the effect from flash bulbs on the accuracy of free throw shooting.

According to the Official Service Bureau of the National Collegiate Athletic Association in the Research Committee report of 1961 the average percentage of field goals made increased from twenty-nine per cent during 1948 to forty-one per cent in 1961.[2] During the basketball seasons of 1963-1964, and 1964-1965 the investigator had fine teams with better than forty-one per cent shooters from the field, but neither of the teams scored consistently from the free throw line. Many basketball coaches have had players that are better than forty per cent shooters but could never score consistently when shooting free throws. "The two greatest hazards to free throwing seem to be shooting poise and fatigue," states Winter.[3] These two hazards were certainly known by the investigator who coached to overcome them. Thus the flash of a flash bulb,

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[1]Louis A. Basile, "Two-Must System for Free Throw," Athletic Journal, XL (October, 1959), 30.

[2]Fred "Tex" Winter, The Triple-Post Offense (Englewood Cliffs: Prentice-Hall, Inc., 1962), p. 168.

[3]Ibid., p. 166.

which could be seen by the free throw shooter at the time of the free throw, was an obstacle that puzzled him. If the flash did affect the accuracy of free throw shooting, it should be known. Thus a study of this problem was important to basketball coaches and the National Basketball Committee of the United States and Canada.

Limitations of the problem. This experimental study was limited to sixteen male basketball players. The sixteen players were members of the Goldfield, Iowa, High School basketball team. They were not necessarily on the varsity team, but all of the subjects were participating in the sport and thus had received instruction in the fundamentals of free throw shooting. With this number of subjects a control day and an experimental day type of test program was devised. Thus the same sixteen team members who participated during the control days also participated during the experimental days.

Because of the expense involved in the large number of flashes needed to conduct this study, the experiment was completed using a transistorized electronic flash unit, Tower 8915, sold by Sears, Roebuck and Company.

The study was limited to a twenty-day controlled test program between October 11 and November 11, 1966. The testing period was selected because it was a time

when basketball practices and games would not interfere with the collection of data. The test program consisted of alternating experimental and control days.

II. DEFINITIONS OF TERMS

Controlled day. A controlled day was the day when the subjects shot only free throws, knowing that there would be no flashing occurring from the electronic flash unit.

Experimental day. An experimental day was the day when the subjects shot free throws, knowing that at any time during their free throw shooting a flash from the electronic flash unit might be seen.

Free throw. A free throw is defined by the Basketball Rules Book as, "the privilege given a player to score one point by an unhindered try for goal from within the free throw circle and behind the free throw line."[1] The free throw styles used by basketball players are many. Some of the shooters use the one-hand push shot method, while others shoot the two-hand underhand shot. Sharman says, "most players shoot one-handed from any

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[1]The National Federation of State High School Athletic Associations, Basketball Rules Book, 1966-67, p. 15.

position on the court."[1] All of the subjects shot the one-hand push shot from the field, therefore they all shot this style when shooting the free throws.

High school. The term high school in this study refers to grades nine, ten, eleven, and twelve at Goldfield High School.

Subjects. The subjects were sixteen male basketball players who participated in the experiment. They were all members of the Goldfield basketball team.

t-test. The t-test was the method used in treatment of the data for testing the differences between two means to determine whether or not there was a significant difference between the controlled and experimental activities.

III. PROCEDURE

A review of related literature on free throw shooting was made to determine what research findings had been made on the problem and what conclusions had been reached. Sixteen varsity basketball players were selected from the Goldfield High School basketball team. These

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[1] Sharman, op. cit., p. 94.

sixteen subjects were not necessarily members of the Goldfield traveling basketball team, but each of the subjects had received instruction on the techniques of free throw shooting. A twenty-day test program, consisting of alternating experimental and control days was developed. The sixteen subjects acted as one group and took part in the experiment on each of the control and experimental days.

The study was conducted by the investigator and assisted by the two student team managers in the Goldfield High School gymnasium. On the control day, each of the subjects was required to shoot ten free throws at the west basket and ten free throws at the east basket. Eight subjects were stationed at each of the two ends of the basketball court. The subject who was the free throw shooter positioned himself inside the free throw circle and six subjects occupied the free throw lane. They positioned themselves along the lane in the respective zones as would players during a regular basketball game at the time of a free throw. The eighth subject waited off the court until the ten free throws were shot, and then he would take his position along the free throw lane while each subject moved up into the next position. Thus the shooter became the subject waiting off court and one of the subjects previously positioned on the

lane became the shooter. The two assistants charted each of the free throws shot by the subjects. They recorded if the shot was successfully completed or if the shot was not successfully completed. After each ten shots, this rotation was again performed by the subjects; thus each subject was a shooter and occupied every position during the test day. When all the subjects had finished shooting their free throws, the two groups of eight would change baskets, and the same procedure would be followed.

During the experimental day the procedure was similar to that of the control day, but the experimental variable was included. The subjects shot the same way as they did on the control day and rotated their positions in the same manner. They were now aware of the possibility of the flash being seen as they attempted each free throw. A flash unit was operated by the investigator standing in one of four zones. From each of these four zones the flash could be seen by the free throw shooter. The zones were areas in the gymnasium where spectators might be sitting or standing when taking a picture of the players shooting free throws. During the free throw shooting the flash unit was flashed intermittently by the investigator. The flashing took place randomly within the zones; therefore, the free

throw shooter did not know when and from what position the flash unit was going to flash. The flash would only take place when the shooter had the ball in the cocked position. Again the two student managers charted each of the free throws shot and recorded if the shot was successfully completed or was not successfully completed and if the flash occurred during this attempt.

If a subject missed a test day, he was given the opportunity to make-up his free throw attempts under the same conditions as if he had been there.

IV. REVIEW OF THE LITERATURE

Much has been written in regard to free throw shooting and its importance to the final score of a basketball game. There has been literature written concerning the many different styles and techniques used by basketball players when shooting a free throw. The investigator also studied the available literature concerned with the motor skills of people, especially basketball players, and the effect psychological and physical pressures and distractions of various types have on these motor skills.

Importance of free throws. The importance of accuracy at the free throw line is certainly known by the

coaches and players who have either lost or won a close basketball game. Masin stated, "nobody has to sell either the coach or the player on the vital importance of foul shooting. The box score tells the story in black and white. Probably three out of every four close games are decided on the foul line."[1] There are many coaches who have been coaching this game of basketball for many years and have learned that the team with free throw accuracy certainly has a definite advantage in winning the game. "Most coaches will agree that many games are won or lost at the free-throw line, especially during the final quarter when the pressure is greatest," stated Waugh.[2] During the 1958-1959 season at Oglethorpe University, the basketball team won twenty-four games and lost only one. Oglethorpe successfully completed 519 field goals for a total of 1,036 points. The shooting percentage from the field was forty-three and one-half per cent. From the free throw line they scored 427 points for a shooting percentage of sixty-five and nine-tenths per cent. These figures showed that the team achieved

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[1]Herman L. Masin, "Foul Shooting Styles and Practices," Seal-O-San Basketball Coaches Digest, (1957-1958), 10.

[2]Jim Waugh, "Free-Throwing Under Pressure," Scholastic Coach, XXXV (October, 1965), 42.

thirty per cent of its total point production from the free throw line. This certainly proved the importance of free throw accuracy at Oglethorpe University.[1] Another outstanding college coach had this to say about the importance of free throw shooting. Diddle, head basketball coach at Western Kentucky State College, said, "foul shooting is a very serious business. Because we believe that a good foul-shooting team will win the close games, a great deal of time is spent on free throws at Western."[2]

The free throw bonus rule has given the team shooting the free throw the chance to increase their score without the defense of the opponent. The bonus rule is defined by the Basketball Rule Book as, "a second free throw awarded if the foul is a common foul which occurs after the offending team has been charged during the half with four personal fouls in a game played in quarters or with six personal fouls in a game played in halves, and provided the first free throw for the common foul is successful."[3] This fact alone causes

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[1]Garland F. Pinholster, Illustrated Basketball Coaching Techniques (Englewood Cliffs: Prentice-Hall, Inc., 1960), p. 43.

[2]E. A. Diddle, "The Offensive Fundamentals in Basketball," Championship Basketball by 12 Great Coaches (Englewood Cliffs: Prentice-Hall, Inc., 1965), 10, 12.

[3]The National Federation of State High School Athletic Associations, Basketball Rules Book, 1966-1967, p. 30.

the free throw to become important as Watts said, "when the bonus free throw was allowed in basketball, the free throw opportunity became more valuable. The opportunity to score two points on a foul compensated somewhat for loss of possession."[1] Ramsay wrote that a team that consistently makes the tough, pressure-paced foul shots at the end of the basketball game will be the winning team a great percentage of the time.[2]

The investigator, having reviewed the literature pertaining to the importance of free throw shooting, discovered that basketball coaches feel that accuracy at the free throw line is extremely important.

Techniques of free throws. For many years coaches, players, and critics of the game have argued over the best style of shooting the free throw. Pro and con arguments have been presented as to the type of shot that would render the greater results. Some of the coaches believed the one-handed shot is better than the two-handed shot when shooting a free throw, while others contend the two-handed shot is the best. Sharman felt

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[1]Stan Watts, Developing an Offensive Attack in Basketball (Englewood Cliffs: Prentice-Hall, Inc., 1959), p. 133.

[2]Jack Ramsay, Pressure Basketball (Englewood Cliffs: Prentice-Hall, Inc., 1963), p. 135.

that the most outstanding players will use the same style of shot that they use from the field. Because so many players shoot one-handed today, the free throw shooter will also shoot this style.[1] Other coaches felt this idea was sound basketball. Pinholster stated, "it is recommended that the free thrower shoot his free throw shot nearly like that of his set shot or jump shot. The one-hand push type free throw seems to correspond closely to the other shots that are employed during the normal course of basketball."[2] Masin felt that two factors have accounted for the one-handed set shot becoming the style of free throw shot that most of the players are using. "First is the fact that the two-hand underhand toss is not a natural means of shooting; it's an artificial style that often requires considerable practice to master. The second influencing factor is the incredible improvement in set shooting."[3] The one great advantage of the one-handed shot is that it conforms to the field goal shooting of the player. The player would become twice as accurate of a free throw shooter if he concentrates on just one style of shooting.[4]

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[1] Sharman, op. cit., pp. 93-94.

[2] Pinholster, op. cit., p. 43.

[3] Masin, op. cit., p. 10.

[4] Ibid., p. 12.

There are also advantages in shooting the free throw using two hands. The value of the two-handed free throw should not be underrated. Research has shown that the two-handed free throw shot produces better accuracy than the one-handed free throw shot when fatigue enters the picture.[1] Sharman said, "from the coaching standpoint, the biggest advantage of the two-hand underhand free throw is its position on the line. The player's arms hang straight down in the very relaxed position and it is in the arms that pressure and tension are felt most."[2]

Regardless of which style the free throw shooter employs there are certain techniques that are considered suitable for each. Masin listed the following techniques.

1. Relax when you get on the foul line. Make an effort to keep your muscles loose and your mind relaxed. If you feel tight, bounce the ball a few times until you loosen up.
2. Train your eyes on the front rim and keep them there from the beginning to the end of the shot.
3. Keep the palms of the hands off the ball--control is assumed by the fingers, no matter what type of shot you use.
4. Follow through naturally.[3]

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[1]Watts, op. cit., p. 133.

[2]Sharman, op. cit., p. 95.

[3]Masin, op. cit., p. 12.

Other coaches have developed their ideas on the techniques of free throw shooting. Sharman believed that there are certain principles that can be applied to all styles of free throw shooting.

1. Throw with rhythm and smoothness.
2. Train yourself to concentrate.
3. Learn to relax and be comfortable.
4. Establish a definite routine.
5. Take advantage of the 10-second time limit.
6. Don't have too many thoughts before shooting.
7. Learn to keep head as still as possible.
8. Keep ball straight.
9. Line up ball properly.
10. Walk slowly to the free-throw line.[1]

As a third illustration of general techniques to increase the accuracy of free throw shooting, Pinholster listed the following principles.

1. Relaxation is essential.
2. Concentration is essential.
3. Aiming is essential.
4. A good follow through is essential.[2]
5. Confidence is essential.

The author found that basketball coaches felt the one-handed free throw shot is better than the two-handed shot. The one-handed shot is used during the game when shooting field goals, thus the player should use it when shooting a free throw. The two-handed shot is certainly not to be discarded, as it has shown its merit. Chiappy stated, "every player cannot be required to shoot a certain way because what is good for one boy is not always

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[1] Sharman, op. cit., pp. 99-103.

[2] Pinholster, op. cit., pp. 42-43.

good for another."[1] In general, coaches favored the one-handed shot in free throw shooting to increase shooting accuracy. Regardless of shooting style, coaches generally had their players employ certain techniques at the free throw line. These techniques are usually accepted by the majority of basketball coaches.

Psychological and physical pressures affecting free throws. Each time an athlete competes in an athletic event various pressures have the opportunity to decrease his effectiveness at doing his best. These pressures fall under the two categories of psychological and physical. Accuracy at the free throw line, as with field goal shooting, certainly could be affected by these pressures.

As of the present, physiologists and biologists have not determined the physical limits for an individual under given conditions. They are much closer to knowing these limits than they are the mental pressures. As Jordan said, "there is a great amount of evidence to suggest that many barriers are not physical at all but psychological."[2] Within the category of psychological

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[1]John E. Chiappy, "The Free Throw Shooting Story," Seal-O-San Basketball Coaches Digest, (1961-1962), 8.

[2]Peyton Jordan, "Emotional Fitness for Track and Field Competition," Journal of Health, Physical Education, and Recreation, XXXII (February, 1961), 29.

barriers in free throw shooting are the lack of confidence in shooting, the lack of desire to do ones best, the lack of motivation and morale, and the lack of a good attitude towards the sport itself. Jordan continued saying, "one can hardly separate desire, motivation, and morale when seeking athletic success. These are the cornerstones that add up to the emotional and mental readiness allowing the athlete to perform to his best potential."[1]

The physical pressures and distractions that are present to an athlete are such factors as fatigue, shooting poise, crowd noise, body build, physical coordination, and motor skills. Winter felt that there is a drop of ten per cent in free throw shooting recorded at the beginning and end of practice sessions.[2]

The maximum skill in athletics may be limited by certain body conditions. Morehouse and Miller felt that body weight, body height, and coordination are three such conditions that limited athletic skills. The heavier the person in relation to his musculature, the greater the limitation. The short person cannot guide the basketball through a large range of movement, thus their control

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[1] Ibid., p. 29.

[2] Winter, op. cit., p. 166.

is not as successful as the tall person.[1] Accuracy involves coordination of eye and muscle. "Eye-muscle coordination establishes the relationship of the target object to the body so as to guide the movements directly to the target," stated Morehouse and Miller.[2] Without this eye-muscle coordination the free throw shooter will not become the accurate shooter he wishes to be. Mathews felt that the immediate capacity of any player to perform in many varied stunts or athletic events is referred to as general motor ability.[3] Therefore, these physical pressures that free throw shooters have, certainly show that the shooter must have good general motor ability to have accuracy at the free throw line.

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[1] Laurence E. Morehouse and Augustus T. Miller, Physiology of Exercise (Saint Louis: C. V. Mosby Company, 1963), p. 52.

[2] Ibid.

[3] Donald K. Mathews, Measurement in Physical Education (Philadelphia: W. B. Saunders Company, 1958), p. 116.

CHAPTER II

TABULATION AND INTERPRETATION OF DATA

The total number of free throws made in relationship to the number of free throws shot were obtained from each of the subjects during the control and experimental days. These raw scores were recorded and arranged in tables which were used to determine statistically if there was a significant difference between the average number of free throws made during the control and experimental days. The raw scores of each subject may be found in Appendix A.

I. TABULATION PROCEDURE

In determinating if there was any significant difference between the number of free throws made during the control days and the number of free throws made on the experimental days, the statistical method recommended by Johnson was used.[1] This method employs a *t* test which measures the difference between the means of two activities. If it is found that the mean scores are significantly different, the conclusion would be drawn that there is

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[1] Palmer O. Johnson, Statistical Methods in Research (New York: Prentice-Hall, Inc., 1949), pp. 71-80.

evidence of a differential effect between the control and experimental days. However, if it is found that the mean scores are not significantly different, the conclusion would be drawn that there is no evidence of a differential effect between the control and experimental days.

The formula for the significant ratio (t) would, according to Johnson,[1] be as follows:

$$\underline{t} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\Sigma(X_1 - \bar{X}_1)^2 + \Sigma(X_2 - \bar{X}_2)^2}{N_1 + N_2 - 2}\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

(t equals the first mean minus the second mean divided by the square root of the standard error of the difference estimated on the number of degrees of freedom.)

To determine if there was a significant difference a certain level of confidence was needed. A five per cent level of confidence, as suggested by Johnson,[2] was selected in view of the following statements.

1. The results are said to be significant if the conclusion that they are would be erroneous in 1 per cent or less of the cases.

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[1] Ibid., p. 72.

[2] Ibid., pp. 31-33.

2. The results may be significant but further observations are necessary (that is, we suspend judgment) if the conclusion that the results are significant would be wrong in 5 per cent or less but more than 1 per cent of the cases.
3. The results are not significant if our conclusion that they are significant would be in error in more than 5 per cent of the cases.[1]

Because the t test measured the difference between the means of the control and experimental activities, the author first had to determine the average number of free throws successfully completed for each of the two groups. This was done by recording the number of free throws successfully completed by each subject. From this collection of raw scores, the average raw score for both the control and the experimental activities were found. To calculate the average number of free throws successfully completed, the following formula, as suggested by Johnson,[2] was used.

$$\bar{X} = \frac{\Sigma X}{N}$$

(The average score equals the summation of the scores divided by the number of subjects.)

The total number of free throws successfully completed, and the mean number of free throws successfully completed during the control days were recorded in Table I.

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[1] Ibid., p. 32. [2] Ibid., p. 72.

TABLE I

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED BY SIXTEEN BASKETBALL PLAYERS DURING THE CONTROL DAYS, GOLDFIELD HIGH SCHOOL, OCTOBER 11 - NOVEMBER 11, 1966

Subject	Free throws successfully completed 100 free throws west basket	Free throws successfully completed 100 free throws east basket	Total
1	81	78	159
2	76	71	147
3	74	69	143
4	69	69	138
5	61	68	129
6	66	62	128
7	67	59	126
8	57	60	117
9	57	58	115
10	59	55	114
11	56	54	110
12	56	53	109
13	52	45	97
14	45	49	94
15	32	39	71
16	30	33	63
Mean			116.25

The total number of free throws successfully completed, and the mean number of free throws successfully completed during the experimental days were recorded in Table II.

TABLE II

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED BY SIXTEEN BASKETBALL PLAYERS DURING THE EXPERIMENTAL DAYS, GOLDFIELD HIGH SCHOOL, OCTOBER 11 - NOVEMBER 11, 1966

Subject	Free throws successfully completed 100 free throws west basket	Free throws successfully completed 100 free throws east basket	Total
1	71	74	145
2	65	70	135
3	70	72	142
4	71	58	129
5	63	59	122
6	57	53	110
7	55	58	113
8	60	65	125
9	55	52	107
10	47	56	103
11	49	57	106
12	46	51	97
13	46	41	87
14	41	46	87
15	28	36	64
16	26	32	58
Mean			108.125

Johnson[1] referred to the Table for the Distribution of (t) to find the probability of obtaining a value of t greater or equal to + t in repeating sampling. In observing this table it was found that at the five per cent level for 30 degrees of freedom a t test ratio of greater

[1] Ibid., p. 72.

than 2.042 would have to be achieved to conclude that the means were significantly different.

II. INTERPRETATION OF DATA

To interpret the preceding data it is necessary to refer to Table III. Table III shows the result of solving for the t score. The t score for the difference between the means of the control group and experimental group was 0.8965 at the five per cent level of confidence. Therefore, this t score showed the difference between the means was not considered significant at the five per cent level of confidence.

TABLE III

t TEST OF DIFFERENCE BETWEEN MEANS OF THE CONTROL GROUPS AND THE EXPERIMENTAL GROUP AT GOLDFIELD HIGH SCHOOL, OCTOBER 11 - NOVEMBER 11, 1966

Groups	Means	S. E. of Diff.	t
Control Subjects	116.25	8.493	0.8965
Experimental Subjects	108.125		

CHAPTER III

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The problem of this study was to investigate the effect of the flash of a flash bulb on free throw accuracy, to determine if the flash would cause the free throw shooter to be less accurate, and to present information which will aid the National Basketball Committee in determining if there is a need to control flash cameras during basketball games.

I. SUMMARY

It is observed from the value for n equal 30, the probability of getting a value of t greater than or equal to $\pm$ 0.8965 in repeated sampling is somewhere between thirty per cent and forty per cent. Therefore, since a five per cent level of confidence was used, the two groups may be assumed to be random samples from the same normal population or, in other words, that the means of the two groups are not significantly different. Related literature has shown that psychological and physical pressures can affect the shooting accuracy of a free throw shooter. However, there was no significant difference between the average number of free throws successfully completed during the control days and the

average number of free throws successfully completed during the experimental days. Thus the flash of the flash bulb does not cause the free throw shooter to be less accurate.

II. CONCLUSIONS

Based on the statistical analysis of the obtained data, and within the limitations of the sample and the techniques employed, the following conclusion would seem justified: (1) There was no significant difference between the control group and the experimental group. (2) The free throw shooter does not become less accurate when subjected to the flash of a flash bulb.

III. RECOMMENDATIONS

It is recommended that the National Basketball Committee continue to study the effects of physical distractions affecting the accuracy in basketball shooting. This limited study has found that the flash of a flash bulb does not affect the accuracy of the free throw shooter, and therefore it is recommended that no restriction be put on cameras during a basketball game.

The problems and pressures of the sport of basketball are many, and only through continued research and experimentation will they be solved.

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APPENDIX

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED DURING THE CONTROL DAYS

Subject	First Day	Second Day	Third Day	Fourth Day	Fifth Day
1	13	18	14	18	18
2	13	15	12	14	14
3	14	16	13	12	17
4	12	14	14	14	15
5	8	15	11	13	11
6	12	12	14	13	13
7	7	10	10	14	14
8	13	12	12	13	11
9	9	6	9	15	14
10	11	8	9	10	10
11	10	14	10	10	10
12	9	10	8	8	10
13	7	6	11	12	9
14	7	7	9	10	11
15	4	6	7	8	7
16	8	8	7	5	6

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED DURING THE CONTROL DAYS

Subject	Sixth Day	Seventh Day	Eighth Day	Ninth Day	Tenth Day
1	16	16	16	15	15
2	13	18	16	14	14
3	14	17	15	13	16
4	11	13	15	16	14
5	9	13	11	13	13
6	14	12	14	12	13
7	15	13	15	13	16
8	12	17	13	11	14
9	9	13	13	15	12
10	12	16	11	12	11
11	13	12	13	11	11
12	12	12	15	14	11
13	9	11	11	12	9
14	8	10	12	10	10
15	5	9	8	8	9
16	6	2	4	9	8

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED DURING THE EXPERIMENTAL DAYS

Subject	First Day	Second Day	Third Day	Fourth Day	Fifth Day
1	16	15	15	10	16
2	17	12	14	13	12
3	16	13	11	15	14
4	15	14	14	17	13
5	9	10	13	13	16
6	16	12	12	9	15
7	10	8	11	10	14
8	6	10	11	13	13
9	15	4	9	10	9
10	9	13	10	11	4
11	8	12	13	4	8
12	10	9	11	5	10
13	7	9	9	4	12
14	9	7	12	8	5
15	3	3	7	6	7
16	4	5	2	6	7

NUMBER OF FREE THROWS SUCCESSFULLY COMPLETED DURING THE EXPERIMENTAL DAYS

Subject	Sixth Day	Seventh Day	Eighth Day	Ninth Day	Tenth Day
1	16	15	14	13	15
2	15	14	15	16	14
3	13	13	12	15	13
4	7	12	12	14	11
5	12	11	14	13	14
6	12	12	10	11	13
7	13	12	13	11	11
8	12	11	12	11	11
9	10	14	12	13	11
10	12	12	11	13	11
11	14	11	13	11	9
12	10	11	10	11	10
13	10	7	9	11	9
14	8	8	10	8	12
15	6	7	8	10	7
16	3	7	6	8	10